

Systool Web: a new on-line application for the French INRA "Systali" project

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Outline of the presentation

- The French INRA "Systali" project
- Organization of Systool Web
 - Objectives of Systool Web
 - Pedagogical module
 - Calculation module
- Some illustrations
- Conclusions





The Systali project





The "Systali" project

= A renovation of the INRA feed unit system

- To predict more precisely:

1. The NE (UFL), MP (PDI), AA supplies
& the flows of other nutrients (VFA, Gas, Glucose, Fatty Acids)

*Already published
(2013 & 2015)*

2. The animal requirements
& their responses to NE, PDI & other nutrients

Still in progress

- To enlarge the fields of application of the feed unit systems (→ hot countries, intensive diets...)





The INRA "Systali" nutrient supply model

- Prediction of the flows of diet nutrients
- More precise description of Digestive Interactions:

$$Value(diet) = \sum_j p_j \times Table_value(feed)_j \pm DI$$

- Modelling approach of DI:

→ Major impact on OM digestibility

3 Causes: Feeding level (DMI % BW)

Propⁿ of concentrate (0 < <1)

Rumen Protein Balance (=CP intake – CP duodenum)





In addition...

- Other processes impacted by the 3 factors of DI:
 - NDF digestibility & Rumen Fermented OM (FOM)
 - Protein and Starch digestive partition (*through transit rate*)
 - CH₄ production
 - Urinary E & N losses

• Rumen Protein Balance (ration) $\left\{ \begin{array}{l} = \text{Output data} \\ = \text{Input data } (\rightarrow \text{DI}) \end{array} \right.$

$$\text{RPB} = f(\text{PDIME}, \text{PDIMN})$$

=> Iterative process of calculation

→ More complex calculations

→ Computer calculations needed





Organisation of Systool Web





Objectives of Systool Web





Objectives of Systool Web

Due to strong demand from users & professionals

- ✓ To obtain further explanations about the new concepts
- ✓ To practice the use of the new calculation models
- ✓ To integrate all the new equations in their own tools

➔ A simple & powerful tool, quickly implemented (3 months) & funded by AFZ, with 2 main objectives:

- A pleasant e-learning tool for the nutrient supply model
- An efficient computation tool for feed & ration values





Pedagogical module





- Area
- Neighboring
- Predecessor
- Successor
- Equation
- Graphic
- KuProBalrefj
- Delta_OMd_Anij
- Delta_OMd_RPBj
- Delta_OMd_FLi
- Delta_OMd_PCOj
- OMdj
- FLrefj
- Intercept_RPB
- Intercept_FL
- Intercept_PCO
- Slope_RPB
- Slope_FL
- Slope_PCO
- Urea

- 2 sub-models : the "Feed model" & the "Ration model"
- Variables gathered in different areas
→ energy, nitrogen, cell-wall, starch, fatty acids...
- Representation of the chaining variables according to the equations of the models:
→ Neighboring-, predecessor-, or successor-diagrams
- Detailed description of all the equations of the models
- Graphs of the main relationships between variables



- Area
- Neighboring
- [Predecessor](#)
- Successor
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- RuProBalrefj
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- Delta_OMd_RPBj
- Delta_OMd_FLj
- Delta_OMd_PCOj
- [OMdj](#)
- FLrefj
- Intercept_RPB
- Intercept_FL
- Intercept_PCO
- Slope_RPB
- Slope_FL
- Slope_PCO
- Urea

Predecessors of feed Omd?



- Area
- Neighboring
- Predecessor
- [Successor](#)
- Equation
- Graphic

- CPj
- FOMj
- MicProtj
- NED
- PDIAj
- PDIEj
- PDIMEj
- PDIMj
- PDINj
- [RuProBal\(diet\)](#)
- RuProBali
- RPBZur(diet)
- RPBzurj

Successors of diet RPB?



Calculation module





Approach & Organisation of calculations

- Equations applied to estimate the Feed values:
 - "Table" values of feeds, without Digestive Interactions (FL=ref)
 - "Diet" values of feeds, with DI (FL, PCO & RPB of actual ration)
==> iterative process of calculation
- Additivity calculation used to obtain the Ration values:
 - "Systali" values of the diets
- Calculation of the Nutrient flows from the ration values
- Deliberately light structure of data:
 - Simple organisation of the Input variables (Rations, Feeds, User Table)
 - No interpretation/transformation of the output variables (self-interpretation by users)





*What can you do
with all these
data?*

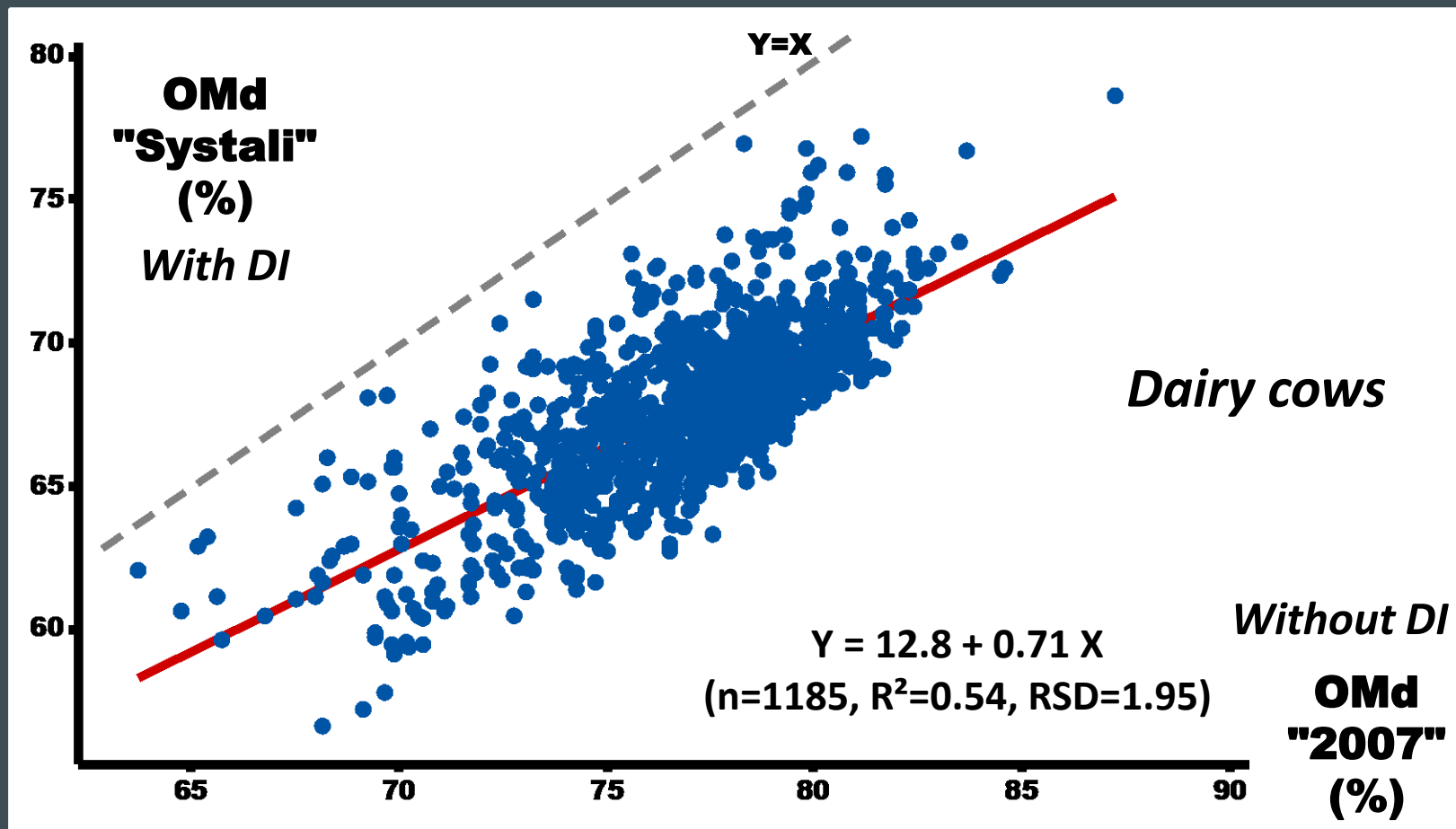
*Just use your brain...
...and add your own touch!*





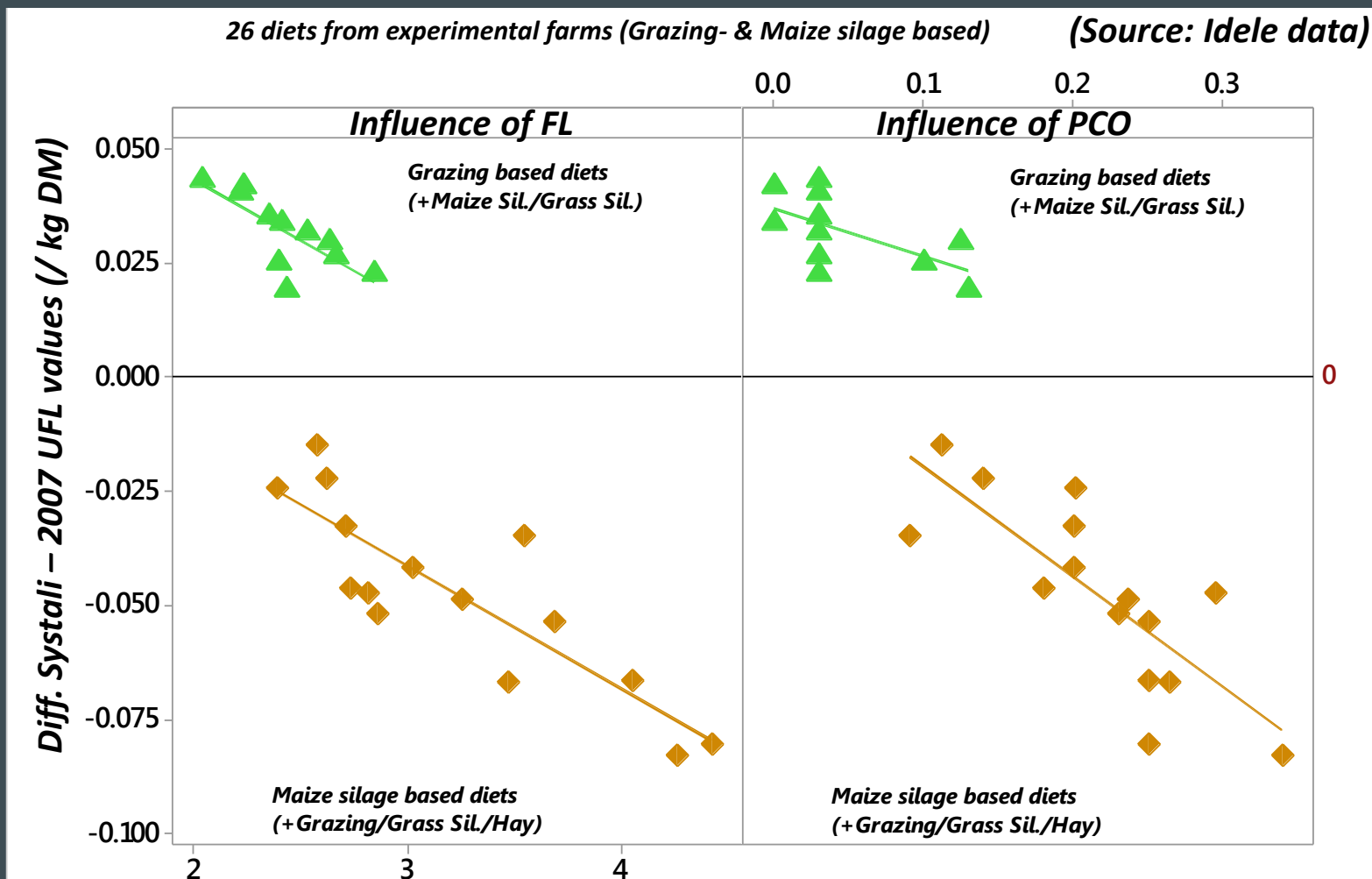
Comparison of OM digestibility of rations "Systali" vs "2007"

Source: J-B. Daniel
(MosarCo Data base)





Influence of FL & PCO on the differences Systali - 2007 of Net Energy ration values





Conclusion





A user-friendly & powerful app

- A synthesis of all the equations of the nutrient supply model
- A simple & illustrative representation of the chaining variables
- A very efficient tool → light-speed calculations:
only 15-20 sec. for 600 rations including 6000 feeds!
- Systool web currently in French...
...but an English version available very soon!
- Future evolutions:
 - Short-term: Updates with the evolutions of the Systali models
 - Later: Comparisons of INRA Systali & international systems...





And right now?

Why don't you try it?

→ www.systool.fr

login: user01, user02, ... , user09, user10

password: EAAP2015

> even on your smartphones!

You can use it for free...

...until the end of the meeting!

Try it, enjoy... and adopt it!





**Thank you
for your
attention!**

